What is claimed is:

1. An optical transmission system for transmitting a signal lightwave comprising a plurality of component signals each having a different wavelength, the optical transmission system comprising:

(a) at least one optical transmitter;

(b) at least one optical receiver;

(c) an optical fiber transmission line that:

(c1) is installed between the at least one optical transmitter and the at least one optical receiver; and

(c2) has a length of at most 150 km; and

(d) an optical component that:

(d1) is installed between the at least one optical transmitter and the at least one optical receiver; and

(d2) gives a loss to the signal lightwave;

the component signals including a component signal having a wavelength of λ_a and a component signal having a wavelength of λ_b;

the optical transmission system being designed such that:

(e) the total transmission loss in the optical fiber transmission line is smaller at a wavelength of λ_b than at a wavelength of λ_a;

(f) the insertion loss of the optical component is larger at a wavelength of λ_b than at a wavelength of λ_a; and

(g) the difference in power between the component signal having a wave-

length of λ_a arriving at the at least one optical receiver and the component signal having a wavelength of λ_b arriving at the at least one optical receiver is smaller than the difference in the total transmission loss in the optical fiber transmission line between the wavelengths λ_a and λ_b.

2. An optical transmission system as defined by claim 1, wherein the power of the signal lightwave decreases monotonously form the at least one optical transmitter to the at least one optical receiver.

3. An optical transmission system as defined by claim 1, wherein any of the component signals has a wavelength of at most 1,520 nm and any other of the component signals has a wavelength of at least 1,570 nm.

4. An optical transmission system as defined by claim 1, wherein each of the component signals has a bandwidth of at least 20 nm.

5. An optical transmission system as defined by claim 1, wherein the component signals have a wavelength spacing of at least 10 nm.

6. An optical transmission system as defined by claim 1, wherein the optical fiber transmission line has a transmission loss of at most 0.4 dB/km at a wavelength of 1.38 μm.

7. An optical transmission system as defined by claim 1, wherein the at least one optical receiver comprises an avalanche photodiode.

8. An optical transmission system as defined by claim 1, wherein the at least one optical receiver comprises a PIN photodiode.

9. An optical transmission system as defined by claim 1, wherein the optical component is a member of the group consisting of an optical multiplexer for

combining the component signals and an optical demultiplexer for separating the component signals.

10. An optical transmission system as defined by claim 1, wherein the optical component is a variable attenuator.

11. An optical transmission system as defined by claim 10, the optical transmission system further comprising:

(a) an optical multiplexer for combining the component signals; and

(b) an optical demultiplexer for separating the component signals;

the variable attenuator being installed at a place selected from the group consisting of a place posterior to the optical multiplexer and a place anterior to the optical demultiplexer.

12. An optical transmission system as defined by claim 10, wherein the variable attenuator has a variable loss-wavelength dependence.

13. An optical transmission system for transmitting a signal lightwave comprising a plurality of component signals each having a different wavelength, the optical transmission system comprising:

(a) at least one optical transmitter;

(b) at least one optical receiver;

(c) an optical fiber transmission line that is installed between the at least one optical transmitter and the at least one optical receiver; and

(d) an optical component that:

(d1) is installed between the at least one optical transmitter and the at least one optical receiver; and

(d2) gives a loss to the signal lightwave;

the component signals including a component signal having a wavelength of λ_a and a component signal having a wavelength of λ_b;

the optical transmission system being designed such that:

(e) the total transmission loss in the optical fiber transmission line is smaller at a wavelength of λ_b than at a wavelength of λ_a;

(f) the insertion loss of the optical component is larger at a wavelength of λ_b than at a wavelength of λ_a; and

(g) the difference in power between the component signal having a wavelength of λ_a arriving at the at least one optical receiver and the component signal having a wavelength of λ_b arriving at the at least one optical receiver is smaller than the difference in the total transmission loss in the optical fiber transmission line between the wavelengths λ_a and λ_b.

14. An optical multiplexer for combining a plurality of component signals each having a different center wavelength to constitute a signal lightwave, the optical multiplexer having an insertion loss that increases with increasing center wavelength of the component signals.

15. An optical multiplexer as defined by claim 14, wherein the component signals have a center-wavelength spacing of at least 10 nm.

16. An optical multiplexer as defined by claim 14, wherein any of the component signals has a center wavelength of at most 1,520 nm and any other of the component signals has a center wavelength of at least 1,570 nm.

17. An optical multiplexer as defined by claim 14, wherein any of the compo-

nent signals has a center wavelength of at most 1,410 nm and any other of the component signals has a center wavelength of at least 1,570 nm.

18. An optical multiplexer as defined by claim 14, wherein any of the component signals has a center wavelength of at most 1,310 nm and any other of the component signals has a center wavelength of at least 1,590 nm.

19. An optical demultiplexer for separating a plurality of component signals each having a different center wavelength from a signal lightwave, the optical demultiplexer having an insertion loss that increases with increasing center wavelength of the component signals.

20. An optical demultiplexer as defined by claim 19, wherein the component signals have a center-wavelength spacing of at least 10 nm.

21. An optical demultiplexer as defined by claim 19, wherein any of the component signals has a center wavelength of at most 1,520 nm and any other of the component signals has a center wavelength of at least 1,570 nm.

22. An optical demultiplexer as defined by claim 19, wherein any of the component signals has a center wavelength of at most 1,410 nm and any other of the component signals has a center wavelength of at least 1,570 nm.

23. An optical demultiplexer as defined by claim 19, wherein any of the component signals has a center wavelength of at most 1,310 nm and any other of the component signals has a center wavelength of at least 1,590 nm.

24. An optical multiplexer for combining a plurality of component signals each having a different center wavelength to constitute a signal lightwave, the optical multiplexer being incorporated into an optical transmission system;

the optical transmission system comprising an optical transmission line;

the optical multiplexer having an insertion loss-center wavelength property that has a tendency reciprocal to that of the loss-wavelength property of the optical transmission line.

25. An optical demultiplexer for separating a plurality of component signals each having a different center wavelength from a signal lightwave, the optical demultiplexer being incorporated into an optical transmission system;

the optical transmission system comprising an optical transmission line;

the optical demultiplexer having an insertion loss-center wavelength property that has a tendency reciprocal to that of the loss-wavelength property of the optical transmission line.

26. An optical multiplexer for combining a plurality of component signals each having a different center wavelength to constitute a signal lightwave, the optical multiplexer being incorporated into an optical transmission system;

the optical transmission system comprising an optical demultiplexer and at least one optical receiver;

the optical multiplexer having an insertion loss-center wavelength property that has a tendency similar to that of the signal power-wavelength property of the component signals arriving at the at least one optical receiver when the insertion losses of the optical multiplexer and demultiplexer are excluded.

27. An optical demultiplexer for separating a plurality of component signals each having a different center wavelength from a signal lightwave, the optical demultiplexer being incorporated into an optical transmission system;

the optical transmission system comprising an optical multiplexer and at least one optical receiver;

the optical demultiplexer having an insertion loss-center wavelength property that has a tendency similar to that of the signal power-wavelength property of the component signals arriving at the at least one optical receiver when the insertion losses of the optical multiplexer and demultiplexer are excluded.